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Nickel on the Threshold of a New Era

UNTIL quite recently nickel, like many other metals, was still in short supply; indeed, it was expected that the gap between production and demand, though narrowing, would remain for a considerable time to come. At the present time, however, due to a falling off in demand for defence programmes and doubts as to the usefulness of stockpiling strategic materials, there are unmistakable signs that the supply and demand position for nickel is coming into balance more rapidly than had been anticipated.

The Federal Government is turning over to civilian users nickel that had been intended for the U.S. national stockpile. As reported elsewhere in this issue, this accession will provide U.S. industry with additional supplies estimated at 58,500 s.tons this year and 67,500 s.tons in 1958. It is, in fact, thought that the fourth quarter's output will not be fully absorbed by industrial users.

An easing of the nickel shortage in the U.S. will not necessarily result in an immediate improvement in shipments to other countries, but it can scarcely fail to have favourable implications for U.K. and Continental users, if only by reducing competition from American companies for the supplies available for these markets. The subdued tone of the free nickel market in London and the Continent, coupled with the lower free market prices now prevailing, indicates that already the supply position in Europe is becoming appreciably less critical, though some shortage relative to requirements still exists. European requirements at the present level, it is stated, can be met in full next year.

In the ten-year period 1946-56 Free World nickel production has doubled, an output of 225,000 s.tons being achieved in 1956, but in recent years defence and stockpiling have been removing about 40 per cent of available supplies from the market. On the face of it, nickel would thus appear to be particularly vulnerable should the much-talked of recession materialize. Looking further ahead, it is expected that in 1961 total Free World nickel-producing capacity will approximate 325,000 - 337,500 s.tons. Assuming that defence demand remains at its present level and that nickel is not taken in 1961 for government stockpiling, the 1956 rate of world civilian consumption will have to be increased by more than 75 per cent in order to absorb the output resulting from the expected expansion in nickel-producing capacity.

Confidence that this formidable selling job can be successfully accomplished is expressed by Dr. J. F. Thompson, chairman of Inco, and the president of the company, Mr. H. S. Wingate, who are visiting Britain and the Continent to advise customers and discuss plans and problems with sales and development organizations. Since its inception Inco has always regarded itself as essentially a development company as well as a producer of metals. Dr. Thompson thus welcomes the prospect of a surplus of nickel, which will at last provide an opportunity of developing the uses which have been lying fallow for several years. Presumably, these dormant fields must include a number of requirements now being met to a varying degree by other materials which, it is anticipated, will be replaced by nickel or possibly improved by suitable additions of this metal.

However, the extent to which substitution is likely to be involved in the expansion of nickel uses is as yet a matter for speculation.

The markets for nickel are certainly very broadly based. Existing uses have been described as a "distillation of applications that have withstood tremendous pressures". Expanding outlets can clearly be foreseen in stainless steel, electroplating, and in the special alloys for electronics and instrumentation. Particularly promising are the opportunities presented by the field of high temperature materials, since nickel appears to be uniquely beneficial to a wide variety of alloys designed for strength and resistance to corrosion at high temperature.

Inco and Mond Nickel have over 2,000 people engaged in development and sales activities; the \$175,000,000 Manitoba project is itself an impressive testimony of faith in their ability to meet this challenge. In fact, Dr. Thompson went so far as to state that, in the absence of a major world recession, the industry's chief problem was to make enough nickel available for future needs. Extensive and costly exploration is being undertaken in all parts of the world and it is believed that opportunities will be presented for developing any promising new deposits which come to light.

The critical period for nickel is expected to be 1960-61, when the huge Manitoba project is scheduled to start production. Having completed its stockpile deliveries to the U.S. Government in 1958, Inco itself will have no protection against the possibility of temporary over-supply in the form of "puts" clauses in incentive contracts. Some of the other nickel producers, however, are protected up to 1961, total "puts" rights amounting to 12,000 s.tons of nickel and 10,000 s.tons of copper, all of which represent high-cost metal produced under premium price contracts. Should production temporarily outrun the development programme, a certain amount of marginal material would thus be removed from the market. With no fewer than 14 by-product elements from nickel recovery Inco's own cost position is extremely strong, and it is doubtless for this reason that the company can view with equanimity present interest in the vast laterite resources of Cuba and the Philippines, where by-product recovery would, in all probability, be limited to one or two metals such as cobalt and/or iron.

We have previously referred to the opening for British exporters of mining machinery and equipment, which appeared to be presented by the huge Manitoba project. The opportunity was therefore taken at a recent conference in London of asking Dr. Thompson about Inco's buying policy. The reply could scarcely be more encouraging. Obviously and understandably, the company buys as much as it can from Canadian industry, but otherwise orders are placed wherever possible with U.K. manufacturers, not only for mining machinery, but for all types of equipment used.

AUSTRALIA'S SEARCH FOR IRON ORE

The Minister for National Development has stated that the iron ore position in Australia is alarming, and that reserves are equal to only 40 years' supply. The Broken Hill Proprietary Co. is importing iron ore from New Caledonia, but not in large quantity; it has in past years carefully examined the Eyre Peninsula, in South Australia, and secured what appear to be the outstanding occurrences in the Middleback Ranges; at present, intensive examination is being made of the country in the Cape York Peninsula, Queensland, where extensive ferruginous deposits are known. Tasmania has high grade iron deposits in the north and on the West Coast, and the latter are

about to be examined by Rio Tinto Ltd. Western Australia has a large occurrence at Koolyanobbing, 250 miles inland, which distance is a bar to its utilization.

Three States have ideas of establishing State steel industries, writes our correspondent in Melbourne, but on present data, the collective ore resources in any one State appear inadequate to warrant the heavy expenditure called for to establish an economic industry, within the boundary of a single State. It would seem to be sounder policy to permit the export of ore from the several occurrences to one central smelting organization to ensure long life and economical production. An aspect of the future of the iron industry is the very large deposits of taconite in the Middleback Ranges. The Broken Hill Proprietary Co. has commenced research into their utilization, and a successful outcome would mean a substantial addition to the iron ore resources of this country.

It has been reported that a Melbourne company representing British steel interests is to search for iron ore on privately held leases in the Middleback Ranges. The company organizing the project is Ore Search Proprietary.

PUSHING BACK THE ICE AGE

Of all countries on earth, Canada and Russia alone possess a vast, undeveloped frontier. Neither nation has yet exploited half of the surface area within its own borders, for the land mass of the Arctic regions is overwhelmingly wider than the two belts of civilization reaching upwards from east and west through the tundra.

The Arctic offers a staggering conception of surface area. Even disregarding this deterrent of vast distances, the northern reaches of Canada and Russia are further protected from the inroads of man by inhospitable climatic conditions. Yet Canadians and Russians watch the Arctic, seeing through the discerning eyes of modern man the almost inconceivable potentialities that exist there. For the mineral resources of the northland are known to be worthy of thorough investigation. Their final exploitation will demand a great measure of determined activity.

The hardest task may well be the long transportation systems that must be employed if either Canada or Russia is to work successfully her Arctic ores. Yet, despite the obvious difficulties involved, by turning towards the Arctic frontier the two countries can grasp the best chance of all the nations to tap new and untouched reserves of wealth.

These points were brought out recently in an address delivered to the International Alumni Association at Toronto. The address attempted to forecast how the resources of far-northern Canada may contribute to the economic progress and strength of the Dominion within the next fifteen years, and considered what steps should be taken to assist in their development.

While little is known in detail of the efforts that are being made in the U.S.S.R. to exploit the resources of its northern areas, it is clear that the Soviet Union is making great strides. The importance of northern development was already being recognized forty or fifty years ago when two railways were constructed in the northern European portion of the country, one to Archangel and the other to Murmansk. During World War II a lateral link some 200 miles in length was constructed between these two lines.

More recently the pace of exploration and development has been accelerated. A railway line 1,100 miles in length from Korlas to Salekhard—about 200 miles running above the Arctic Circle—has been built to open up new mines near the Arctic coast in the Ural region. Over 1,000 miles of

highways have been constructed in the northern part of Eastern Siberia in order to develop a great mineralized region. River transportation systems are being increasingly developed and industries other than mining are the subject of intensive study. Research is being pushed ahead throughout the northland, and the net result of all these activities is that new cities are appearing well above the Arctic Circle. It is apparent that the Russians are markedly aware of the importance of the enormous northern areas.

To date, Canada has not achieved so much. There are several salient reasons for this admission. First, the Canadian population is much smaller than the Russian, and until the comparative present has been concerned mainly with the formidable task of developing the southern part of the country. Secondly, the Canadian democratic belief in private enterprise precludes the movement—by governmental direction—of immense labour forces.

Nevertheless, entirely in line with sound economic progress, a great deal can be accomplished in Canada by dint of a national policy designed to hasten and extend exploitation activities towards the north. It was pointed out in the address that in a region as far flung as the Canadian north, with its attendant problems of distance and climate, the growth of industry cannot be promoted with the speed common to the southerly area of the country. Emphasis was directed towards the realization that if the resources of the Canadian north are to be required in ten or twenty years, the time to begin winning them is now.

It is obvious that only roads, railways, airlines and power stations will allow the development of Canada's northland.

Apart from the mainland the Arctic Islands include a very considerable land area, and these islands remain practically unprospected. The speaker concluded that the Canadian Government might profitably approach Denmark with a view to purchasing Greenland. The island is very close to Canada's northern islands and already has a Canadian company, Frobisher, aiding in the development of its minerals.

ON WINGS OF IRON

The founding of The South Wales Institute of Engineers in 1857 has been commemorated by a centenary brochure describing the growth and development of the Institute, outlining its objects, and paying tribute to the men who have served it well during its century of existence.

It is evident that iron was smelted in South Wales long before the Christian era while the Romans, and subsequently the Welsh of the Middle Ages, worked the iron resources of the area, notably those of the Forest of Dean. After the increasingly rapid advances of the iron industry about 1760, iron was exploited on a large scale in the Merthyr district and the industry quickly spread to Monmouthshire and West Glamorgan.

The growth of the iron industry led to the development of the coal mines so that by 1857 mining was beginning to rival iron smelting in importance, coal output in that year being approximately 7,000,000 tons.

Merthyr remained the centre of iron smelting and the largest town in Wales until 1847. In keeping with the growing enlightenment of the times, professional engineers were discovering the advantages of pooling their experiences and of studying the theory of their work. The Royal College of Chemistry and the Royal School of Mines first saw light of day in the mid-nineteenth century, the Institution of Mechanical Engineers branched off from the Institution of Civil Engineers during the same approxi-

mate period, and thus the founding of the South Wales Institute of Engineers on October 29, 1857, was a logical outcome of the times—and Merthyr was the most appropriate place for its birth.

William Menelaus was unanimously elected first president of the Institute, and six vice-presidents and twelve councillors were elected by ballot. In 1881 the Institute was incorporated by Royal Charter, and by this time mining had become the main interest, the "objects" being stated as "the advancement of engineering science and practice, and the prevention of accidents in mines". New by-laws and regulations have been drawn up from time to time, but the title of the Institute as extended in the Charter of Incorporation of 1881 remains unaltered. While Merthyr Tydfil was originally the main centre, as the years passed Cardiff and to a lesser extent Newport were found to be more convenient for Institute activities. In April, 1878, it was consequently resolved that headquarters be established at Cardiff. Since that date most of the meetings have been held in that city. The Institute buildings in Park Place were opened on January 12, 1894, the library block was added in 1907, while further additions were made in 1937.

A merger between the Institute and the South Western Society of Mining Engineers took effect from July 1, 1952. At the same time the Institute became federated to The Institution of Mining Engineers.

There have been 72 presidents during the 100 years' life of the Institute, the current holder of the office being Mr. Morris Hughes. In June, 1957, the total membership stood at 911, of whom 518 were federated members.

It is worthy of note that the badge of the Institute appeared very much in its present form on the cover of the first issue of the proceedings, depicting an old blast furnace of the type much used in early days. The Welsh motto means "Man has the power to soar". The South Wales Institute of Engineers has risen far since its foundation a century ago, as its centenary brochure shows.

CANADIAN COAL OUTLOOK

A recent survey of the coal and natural gas reserves in Canada puts recoverable coal deposits at 50,000,000,000 tons—sufficient for 3,300 years working at the current rate of extraction. Canadian demand for coal is falling fairly rapidly and the total annual consumption of coal, indigenous and imported, has dropped by almost 12,000,000 tons since 1950.

The main Canadian coalfields are in Nova Scotia and New Brunswick in the east and B.C. and Alberta to the west and are thus further from the main markets of Quebec and Toronto than are the U.S. coalfields of Pa. and Ohio. For more than 20 years coal transport has been subsidized in order to make Canadian coal competitive with American in the principal coal consuming areas. Government assistance has increased from \$500,000 for 560,000 tons in 1930-31 to \$11,300,000 for 3,700,000 tons in 1954-55.

The Canadian coal industry has been hard hit by competition from oil and natural gas and this is expected to increase during the next few years. Production of natural gas in Canada is increasing at a staggering rate and proven reserves amount to many trillion cu. ft. In Alberta itself natural gas now supplies more energy than coal and the projected Trans-Canada pipeline system will greatly increase the area of competition. Despite the growth of population and industry in Canada the outlook for the coal mining industry appears bleak.

The Position of Australian Tin

IN recent years Australian industrial consumption of primary tin has been of the order of 2,400-2,500 tons annually, requiring imports in excess of exports of around 450 tons. With the commencement of a new large producer in August, 1957, the Ravenshoe dredge on Battle Creek, Mt. Garnet, Queensland, there will be a decided step-up in Australian tin production by some 300 tons annually. However, with the official commencement of operation of the tinplate works at Port Kembla also in August, 1957, total annual consumption will rise by about 1,000 tons. Of the total consumption perhaps 100 or 200 tons will be recoverable from drosses, but so far as primary tin is concerned, some 3,400-3,500 tons will now be required annually, of which, at best, perhaps 2,600-2,700 tons an-

This article, describing one aspect of the current mining scene in Australia, is condensed from *Australian Mineral Industry Quarterly Review*, Vol. 10, No. 1. The author is chief mineral economist, Australian Bureau of Mineral Resources, Geology and Geophysics.

nually may be expected from domestic production for a while, the remainder being imported.

The proposed electrolytic tinplate plant, to commence operation in the 1960's, will mean a further increase in consumption and, by 1970, the total tin requirements may be about 4,500 tons.

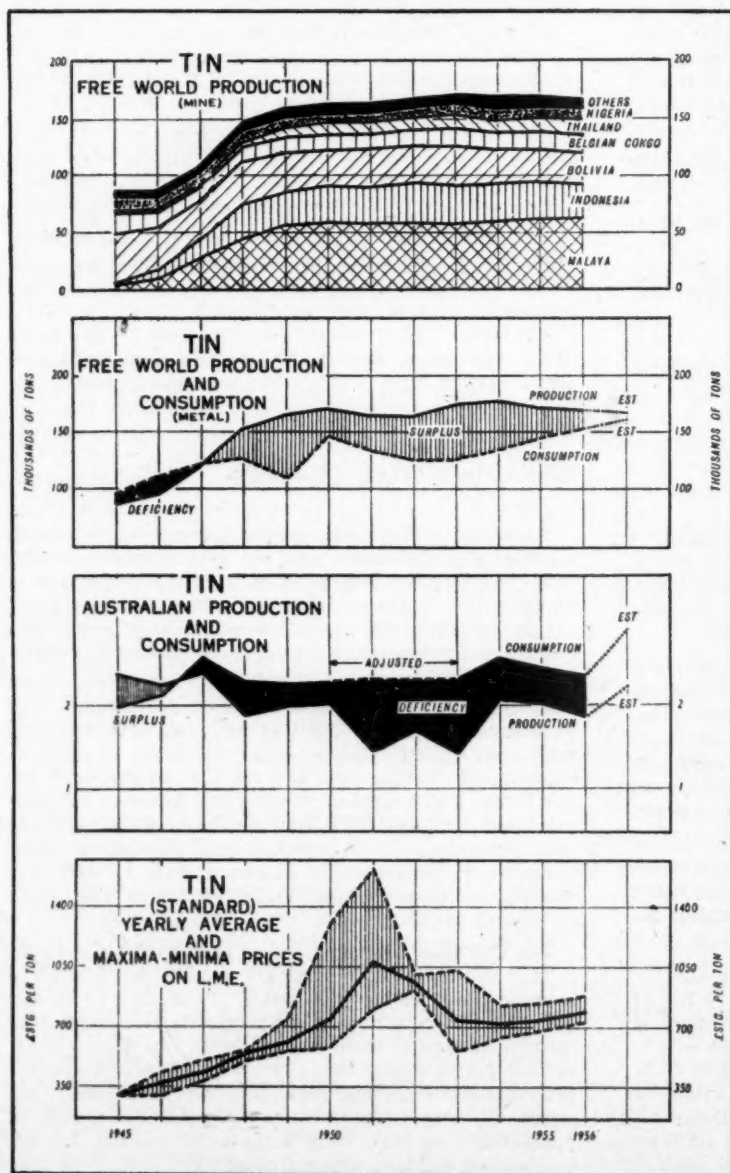
More than 50 per cent of the domestic tin production will now be from three large producers. Of these it is well known that the present established reserves of two of them will suffice for 10 to 12 years. The geological features of the third mine are such that its eventual life must be regarded as rather uncertain. Further, it is also true to say that, for the older Queensland and New South Wales fields, only remnants of the deposits are now being worked in some of them and in others conditions of mining are such that production is declining. So far as can be judged at present, there can be no expectation that the recent revival of mining on the Pilbara field can compensate the decline elsewhere.

By J. A. DUNN

It is clear that, judged by the reserves to date, a serious decline in production must be expected in the latter part of the 1960's, and by 1970 the total domestic production may be below 1,000 tons of tin annually.

To what extent should this picture suggest the desirability of a vigorous prospecting campaign for tin deposits by industry? In looking at this question it is natural that the further question should be asked: What is the trend in the world position and price of tin? It is to this trend that the incentive for prospecting must be related.

Since the International Tin Agreement was drawn up in 1953, the world tin position has undergone a decided change. In 1953, the Free World tin smelter production was 174,200 tons and commercial consumption of primary tin 126,100 tons—a surplus of 48,100 tons. Lower mine production in Bolivia and Indonesia has since reduced total metal availability despite some increase in Malaya and Thailand. But consumption has shown a decided increase: The real surplus of new primary tin in non-Communist countries in 1957 may now be estimated at about 5,000 tons; this may be increased somewhat by imports from U.S.S.R. and China. Should con-



AUSTRALIAN POST-WAR PRODUCTION OF TIN (TONS)

	PRODUCTION		Imports*	Apparent Consumption*
	Mine	Primary Metal		
1946	2,099	2,225	—	2,109
1947	2,449	2,377	180	2,556
1948	1,887	1,884	395	2,279
1949	1,886	1,995	270	2,264
1950	1,854	2,014	249	2,263
1951	1,559	1,459	2,723	4,182
1952	1,611	1,700	180	1,249
1953	1,553	1,443	623	1,985
1954	2,075	2,063	571	2,540
1955	2,017	2,004	506	2,412
1956	2,078	1,850	516	2,342

* Some exports of metal are made.

sumption continue to increase without a corresponding increase in production, it may well be that within the 5-year term of the present agreement the surplus could disappear.

There are strong grounds for assuming that two or three years, at least, may elapse before export quotas become necessary despite the small amounts of tin which the U.K. and Canadian Governments have notified that they intend to release from their stockpiles—sales from the Canadian stockpile will not be made below £830 a ton. Indeed, if consumption continues to increase, it could well prove that the Buffer Stock will not be filled during the present term of the agreement; rather than the imposition of export quotas it is not difficult to contemplate that measures for actual encouragement of production may become increasingly desirable—the recent lifting of the floor price from £640 to £730 under the agreement was such a measure.

Possible World Increase

What are the possibilities of a world increase in production? They are not great as judged from present information. Whether decreased production in Bolivia can be reversed will depend upon reorganization of mining, but grades of ore available in that country are becoming progressively lower. Recent Indonesian reduction of output is probably only temporary. Malayan production, although it has increased recently, will soon be facing the effects of lack of exploration over the prolonged years of terrorism. Thailand may improve still further its output. Burma, with more settled conditions, could perhaps regain its prewar output. Unless there was a very considerable increase in price, there seems no prospect of a significantly greater production in Nigeria and Belgian Congo. Other free-world countries seem unlikely to affect the position noticeably. Possibly in the near future more Soviet or Chinese tin may come on the western market.

Looking at the picture broadly then, unless some large deposits unknown at present become available, the writer would find difficulty in expecting a future production within the Free World in excess of 170,000 to 175,000 tons annually—it may well be less. However, exports from Communist countries may well affect the significance of these figures.

On the consumption side, the main post-war factor which has restrained expansion of consumption, replacement of much hot-dipped by electrolytic tinplate, has now reached its limit. Other containers, such as aluminium or lacquered metal, may increase in use, particularly if tin prices rose unduly, but tinplate appears likely to hold and to increase its position as the principal food container. Further increase in production of tinplate will now mean a greater tin requirement; other uses will also require some increased amounts. At present price levels, the 1957 Free

FREE WORLD POST-WAR POSITION OF PRIMARY TIN* (TONS)

	PRODUCTION			Consumption	Surplus
	Mine	Primary Metal			
1946	86,000	96,000	110,900	—14,100	
1947	108,000	120,600	121,400	—800	
1948	146,500	152,500	125,400	23,200	
1949	157,700	164,100	108,900	55,200	
1950	162,300	169,800	146,100	23,700	
1951	162,500	163,000	133,100	29,900	
1952	165,200	162,500	125,000	37,500	
1953	170,000	174,200	126,100	48,100	
1954	169,500	176,400	133,700	42,700	
1955	168,000	169,500	144,400	25,100	
1956	166,500	168,000	151,100	16,900	

* Source: I.T.C. Statistical Bulletin.

World consumption of around 160,000 tons is not likely to be lowered in the years ahead, a further increase may be expected.

As the writer sees it, the appearance of a serious overproduction of tin seems now unlikely to arise to the extent of forcing prices below present levels. Such evidence as there may be suggests that, on the contrary, a somewhat higher level of tin prices would be more probable in the future.

Having in mind the Australian and world position of tin summarized above, it would seem that Australian producers can look forward in the years ahead to a steady local market at prices no less favourable than they are today. It is also apparent that these conditions provide a decidedly favourable atmosphere for vigorous prospecting. Unless such prospecting is undertaken, and is successful, we may well find that, by 1970, imports of some 3,500 tons of tin annually will be required.

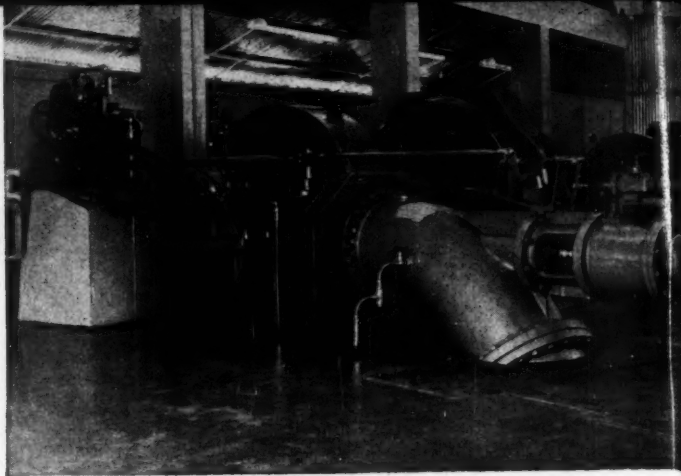
Australia's Need For New Reserves

What scope is there for finding new reserves to take the place of the present larger producing mines when they exhaust their present reserves, and perhaps of increasing further the total Australian output? Available information would not suggest that the prospects are bright. Large-scale dredging propositions are the most important, but there are no obvious areas outside of those being dredged near Mt. Garnet, Queensland, and along the Ringarooma River, Tasmania. Perhaps extensions of these areas may prove dredgeable on further prospecting. That is not to say that new dredging areas may not be found as a result of a well-sustained exploration programme.

New large lode deposits would be important contributors to production could they be found. The best areas to search would undoubtedly appear to be those in which such deposits have been worked in the past—such as the area in which one of our present largest producers, Aberfoyle mine, is located.

Smaller scale new lode or sluicing mines would be helpful, but no great increase may be expected from most of such areas worked in the past or at present. There are indications, perhaps, that the Pilbara field in Western Australia may become more important.

A worthwhile increase would appear to depend on several large new deposits being found. Future requirements and future prices would suggest that a vigorous prospecting campaign for tin is warranted. However, the acceptance of this position would be no justification for ill-considered development of marginal prospects. An expanding market is not an excuse for undue speculation, nor for the support of sub-marginal production.



THE Kilembe mine in Uganda is the realization of a dream born fifty years ago. Although small compared with the mines of the Rhodesian Copperbelt or South Africa's goldfields, it is the largest in East Africa and will have a profound effect on Uganda's economy.

Copper and cobalt deposits were first located in the foothills of the 16,500 ft. Ruwenzori, Mountains of the Moon, by the Duc D'Abruzzi Expedition in 1906; but it was 1926 before Tanganyika Concessions Ltd. pin-pointed the ore-bodies which are being worked to-day. Between 1928 and

F.A.I.E.E., of Electric Power Equipment Ltd., Vancouver. For this hydro-electric scheme, which is the largest private hydro-electric undertaking in East Africa, contracts were placed with The General Electric Co. Ltd. covering two 2,500 kVA. alternators with their associated high voltage switchgear and alarm and annunciator panels.

Construction of the station was started in October, 1954, and the generation of electricity began in June, 1956. This made possible the production and stockpiling of copper and cobalt concentrates until the roast-leach plant at

Hydro-electric Plant at Kilembe

1932 this company developed the workings, most of the work being done by hand labour since there were no roads to bring in the equipment. Then the price of copper dropped and world economic conditions deteriorated so that the company was forced to give up the project.

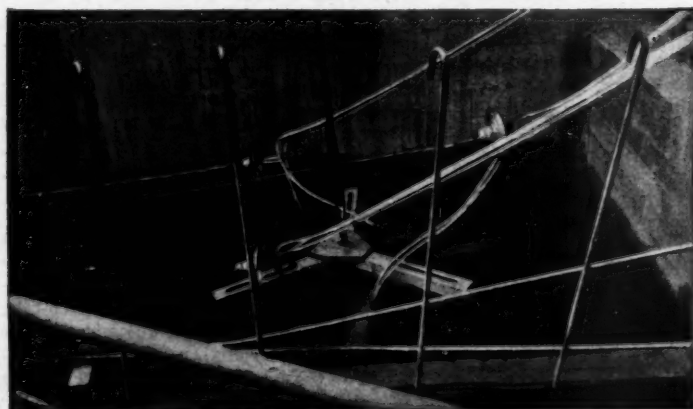
To-day, Kilembe is a self-contained mining community of over 2,000 people of all races. Since 1947 Kilembe Mines Ltd. has built roads, plant buildings, houses and offices which, together with the transport system and power supply, cost about £8,000,000. This cost is inevitably high because of Kilembe's remoteness and the many obstacles that had to be overcome.

Because there is no Uganda Electricity Board supply to Western Uganda, the company had to build its own £600,000 hydro-electric generating plant at the Mobuku River in a valley adjoining Kilembe. The consultant for the hydro-electric project was Mr. F. J. Bartholomew,

Mines, Uganda

Kasese and the smelter at Jinja were ready and installed.

The water intake is in the bed of the river some distance up the Mobuku valley, which is the main route for climbers to the Ruwenzori peaks. Water falls through a grid built across the river bed and flows along a 500 ft. underground conduit to a concrete settling basin which eliminates most of the sand and other solids. A sluice-gate at one end of the tank controls the supply of water which passes into an open conduit flume of iron sheeting. The flume is 8 ft. wide and 5 ft. deep and is supported above ground by a strong wooden framework.



Above Left : One of the turbine and alternator sets in the Mobuku generator house

Above Right : The turbine and alternator sets, showing the inlet pipe

Alongside : The improvised load tank

The flume runs for just over two miles along one side of the Mobuku valley to a forebay perched high on a mountain slope, 600 ft. above the generator house. The forebay is a large concrete tank maintaining a head of water and where sand and stones are allowed to settle. From the forebay the water falls steeply down the mountainside through a penstock into the generator house, where two Gilbert Gilkes and Gordon 33-in. single-nozzle Turgo impulse turbines, each having a rated output of 3,300 h.p., drive the 2,500 kVA., 3.3 kV. G.E.C. alternators. The turbines are fitted with jet deflectors controlled by oil-pressure governors.

The alternators are of the company's standard design for salient pole machines of this output, the magnet wheels being carefully balanced and tested at the works for an overspeed of 1,080 r.p.m. for one minute.

One of the problems which confronted the engineer on site arose from the necessity to test the machines on load

before the transmission lines to the mine had been completed. To do this it was decided to make a load tank. A part of the foundation for Nos. 3 and 4 sets (not yet installed) was filled with water and charged by a pump delivering approximately 3,000 gals. per hr. At the Kilembe workshops electrodes were made up with a suitable spreader and suspended in the tank. Connections from the electrodes were made in aluminium conductor, using four strands per phase, supported on 11 kV. disc-type insulators.

At a water temperature of 20 - 30 deg. C. the loading on one machine was approximately 40 per cent. As the temperature of the water increased, it was possible to absorb the complete output capacity of both machines at boiling point. Each machine was individually tested, and was able to deliver 110 per cent of maximum rated capacity. The two units were then paralleled and similarly loaded before being tripped off the line.

Opencut Mining for Uranium in New Mexico

URANIUM mining by open cut is now being carried out in south central New Mexico, north of Laguna. This open mining project is one of six now being operated in the region by the Anaconda Co., feeding uranium ore to a concentrating mill at Bluewater where it is converted into a high-grade uranium oxide.

As well as the Anaconda Co., the Isbell Construction Co. is also carrying out a large amount of earthmoving to uncover the uranium ore. This latter organization is using the following equipment: two Bucyrus-Erie 120-B electric shovels with 6 cu. yd. Esco dippers, a 54-B electric machine with a 2½ cu. yd. bucket, a 54-B Bucyrus-Erie diesel also with a 2½ cu. yd. bucket, 17 Euclid 22-ton end-dump trucks, three Bucyrus-Erie 29-1 churn drills, a Joy heavy-duty rotary blast hole drill as well as ancillary equipment.

Blasting is being carried out using holes of 8½ and 9 in. dia. spaced at 22 ft. centres at a distance of from 18 to 20 ft. from the back of the bank face. The overburden being taken out is a grey, spongy sandstone tending to absorb the force of the explosive and this has tended to increase the amount of explosive used.

Handling Uranium Ore

Excavated material is being dumped into ravines adjacent to the excavation after precautions have been taken by core-drilling to ensure that uranium deposits do not lie beneath the filled areas.

Rock containing the uranium is so valuable that precautions have been taken in the bulk excavation of the covering material to ensure that none of the uranium-rich ore is hauled to the disposal dumps. This has been done by leaving an average depth of 4 ft. of intermediate material above the uranium.

To reduce the uranium ore to as small a size as possible to cut handling costs, the Anaconda Co. are using a smaller diameter of blast hole together with a closer spacing. Drilling is being carried out using three Failing Holmasters and two Winter-Weiss Portadrills equipped with 4½- and 4¼-in. dia. bits. The spacing being used is 16 ft. on the average and is 14 ft. back from the face. Drill bits are Mills Sy-Ex, used chiefly in the upper layers of sandstone overburden; in the rock containing the actual ore, Bill White jet-type finger bits are to be used whilst in a harder rock which runs through the site K-2 rock bits are employed.

The average depth of drill hole is 45 ft. which is 5 ft. below the average bench depth of 40 ft. Blasting is being carried out using Apache's Quarry Bag Powder No. 3 and Apache's Amogel 40 per cent gelatine. Generally speaking, the holes are being filled to within 15 ft. of the top and detonation is by Primacord detonating fuse.

Transportation and Treatment

Loading of the uranium ore is a selective operation and so quite small shovels are being used such as Bucyrus-Erie 38-B and a Koehring 605 both equipped with 1½ cu. yd. shovels. Where excavation was mainly in the overburden or intermediate layer larger shovels were employed.

The ore from differing sections of the site varies widely in uranium content and so careful blending of the loads is carried out. This is being achieved by numbering each Euclid and each power-shovel loading point and arranging a schedule so that each Euclid brings in loads from differing points in a pre-arranged order.

Treatment of the ore is being carried out at Bluewater and transport from the mining site to this plant is by bottom dump railway trucks. The Euclid trucks discharge their loads into a feeder hopper underneath which is a Pioneer Oro plate-feeder which discharges the ore into the system as required, always leaving the plate covered with ore to reduce wear as the loads are dumped.

To facilitate handling and processing all the ore is reduced to below 12 in. before being loaded into the railway trucks. Reduction is carried out by passing the ore over a screen, oversize going forward to the crushers and that passing the screen being loaded on to railway trucks by a belt conveyor.

Crushing is being carried out by a Pioneer 42 x 48 unit powered by a 200 h.p. diesel engine.

Another interesting aspect of the work is that the wind losses of dust from the conveyor system and the crushing plant are so valuable that a screen has been erected around the whole of this plant.

Steel Still Expanding

AT Brighton the Socialist Party re-affirmed its determination to "re-nationalize" the steel industry as soon as it has the power to do so. So the country seems to be doomed to a continuation of political strife over the ownership of this vital industry. It may be to many a dismal prospect, but the attitude of the makers is strictly correct.

Steel is synonymous with the scientific progress of the age. Supersonic flight, for example, has imposed a demand for new types of steel to break through the sound and the heat barriers, and acknowledging no political distractions, the scientists and technicians are concentrating upon the evolution of new processes to meet the even more exacting requirements of the atomic age.

One of the most promising developments has been the rapidly extending use of tonnage oxygen and steam. In blast furnace practice it has been demonstrated that the injection of steam gives a more uniform blast composition, increases the quantity of hydrogen available for reducing ore, and results in a smoother working of the furnace. Oxygen enrichment has also proved a success by reducing flue dust, and economizing in coke consumption and has stimulated further progress with the development of an entirely new process known as the H process, or more familiarly direct reduction of low grade ores.

Still more revolutionary is the development of the use of oxygen in the steel-melting furnaces. In Germany and in Belgium a successful technique has been evolved based on the substitution of the air blast by a mixture of oxygen and super-heated steam. When this mixed blast is blown, no nitrogen passes through the converter and steel made in this way may contain less than 0.003 per cent nitrogen, combined with top quality deep drawing properties.

In this country the great bulk of the steel output is provided by the open hearth method, but the bulk provision of oxygen at a commercial price has brought into closer scrutiny a reversion to the old Bessemer-Thomas process which is still the traditional method of steel production on the Continent of Europe. Now that scrap is increasingly scarce—and costly—the attractions of the exclusive use of molten pig irons, which is the basis of the Thomas process, become more obvious, and it is significant that of seven new melting shops planned for erection in the U.K. within the next five years, three will adopt the Basic Bessemer process. Other important developments are foreshadowed.

After research and experimental work, extending over a period of 2½ years, the firm of John Summers and Sons, one of the U.K.'s biggest steel producers, has placed on the market a new type of plastic-coated steel which, it is claimed, is far ahead of any similar product available in any other part of the world.

At least two American companies are now producing plastic-coated steel and other U.S. companies are reported to be nearing the production stage, but the merit of the John Summers product, which consists of steel sheets bonded to a plastic coating, lies in its flexibility, corrosion-resistance and surface finish. The new steel is coated continuously from coil, it is relatively cheap, it can be readily moulded into any form and the manu-

facturers believe that there will be a wide market for the product amongst the makers of domestic appliances.

At Sheffield, Firth Vickers have now reached the production stage with another new type of steel known as 520 which is claimed to answer the requirements of the aircraft industry for speeds ranging up to 2,000 miles an hour. Nor is its use confined only to aero-dynamics. It may also be used in rockets and other missiles and in fact production is already on a considerable scale.

Also in Sheffield, William Jessop and Sons produce vacuum-melted steel which commends itself especially to the aircraft industry. The significance of vacuum melting is that it eliminates impurities, particularly oxides, which are the suspected cause of failure in other types of steel.

Jessop's are now developing vacuum melting by high frequency furnaces and also in the ore furnaces with copper crucibles which have been successfully used in the melting of titanium. Their present induction furnace is little more than a research unit of small capacity, but results are so encouraging that they are going ahead with a larger induction furnace with a capacity of 600 lb.

Copper in the Philippines

COPPER is expected to keep its position as the principal mineral product of the Philippines during the next two or three years, according to Mr. Benjamin Gozon, Bureau of Mines Director.

Philippine copper production began to rise soon after World War II. Production steadily increased from 2,200 tons in 1948 to 26,963 tons in 1956 and this year it is expected to jump to 45,000 tons. Last year's output was worth 47,973,079 pesos, exceeding in value the income from gold sales by 3,500,000 pesos.

About 85 per cent of copper production comes from two mines—Lepanto Consolidated and Atlas Consolidated. Last year Lepanto produced 11,667 tonnes and Atlas 11,373 tonnes. Among the smaller producers are the Bagacay Copper Project of the Marinduque Iron Mines Agents in Central Samar Island and the Cabapa Mines of the Mindanao Mother Lode Mines Incorporated in Zambales, which are still in the process of development.

Among the principal mines which have announced plans to expand their ore milling capacities are Atlas (from 6,000 to 10,000 tonnes daily); Mindanao Mother Lode Mines (250 to 400 tonnes); the Paracale-Guma Mines (150 to 200 tons); Itogon-Suyoc Mines (500 to 650 tons). The last two are gold mines producing copper concentrates. Hixbar Copper Co. is building a small mill on Rapu-Rapu Island off Southern Luzon and expects to start operations late this year. Marinduque Iron Mines, which is shipping high-grade copper ore direct to Japan from its properties on Samar, will soon have its Sipalay mine (in Negros Island) in operation. The mine is expected to be one of the largest open-pit projects in the Islands. Development work has proven over 5,600,000 tonnes of 1 per cent copper ore, and 6,800,000 tons of probable ore. The plant is expected to recover some 10,000 tons of metal a year.

Measures planned to assist the industry include increase in credit accommodation from banks to copper producers; reduction of tariff rates for the imported needs of the industry; allowing producers to barter their product within established regulations.

Another factor which is expected to be a great boon to producers is the impending establishment of copper smelters in the country. The smelters will open a new domestic market for copper.

Machinery and Equipment

Stereoscopic Plotting in Photogeologic Studies

Geological interpretation of aerial photography by means of high-order stereo-plotting instruments is a relatively new technique. The two instruments most commonly used to date are the Kelsh plotter and the multiplex plotter, although the ER-55, a projector developed in recent years by the U.S. Geological Survey, will probably be much used for photogeologic interpretation in the future.

The Kelsh and multiplex plotters, and the type using ER-55 projectors, utilize the principle of projection of light of complementary colours through glass diapositives of overlapping aerial photographs. The anaglyph, or stereoscopic model, is viewed on a white surface, called a platen, mounted on a tracing table containing a floating light source or pinpoint of light vertically above a plotting pencil. Because the platen can be moved vertically on the tracing table and because the tracing table can be moved horizontally, any point on the stereoscopic model can be located or measured with respect to any other point.

Inasmuch as the stereoscopic model is orthographically true, setting the floating dot on the apparent ground surface at various places permits accurate horizontal positioning, and lines or geologic contacts can be plotted orthographically on to a base map. The use of high-order stereoscopic plotting instruments assures accurate compilation of geologic data, provided that interpretation is correct

and provided there is sufficient control to orient the model.

Although high-order stereoscopic plotting instruments have been used for many years for topographic mapping purposes, these instruments were first used extensively for geologic interpretation in 1954 by the U.S. Geological Survey. The instrument most widely used thus far for photogeologic purposes is the Kelsh plotter, because of its high enlargement factor and the high resolution of the stereoscopic model. The enlargement factor is herein defined as the relation between the scale of the stereoscopic model and the scale of the original photography.

HYDRAULIC COAL WINNING

A recent report from Poland tells of an hydraulic coal-winning machine that is used to mine, crush and load the coal. The principal components of the GIG-5-64 Type I are a supporting frame, supply

pipe and turret head. Worm toothed gears are operated for vertical and horizontal movement. The unit is equipped with a rotary tube and delivery pipe.

In operation, the apparatus is set up on site and the supply tube attached. The GIG-5-64 can operate with the pipes in any position. Working pressure is 64 atmospheres and water flow 4 cu. m. per min. According to the formation of the seam and the hardness of the coal removal capacity is 60 to 100 tonnes per hour.

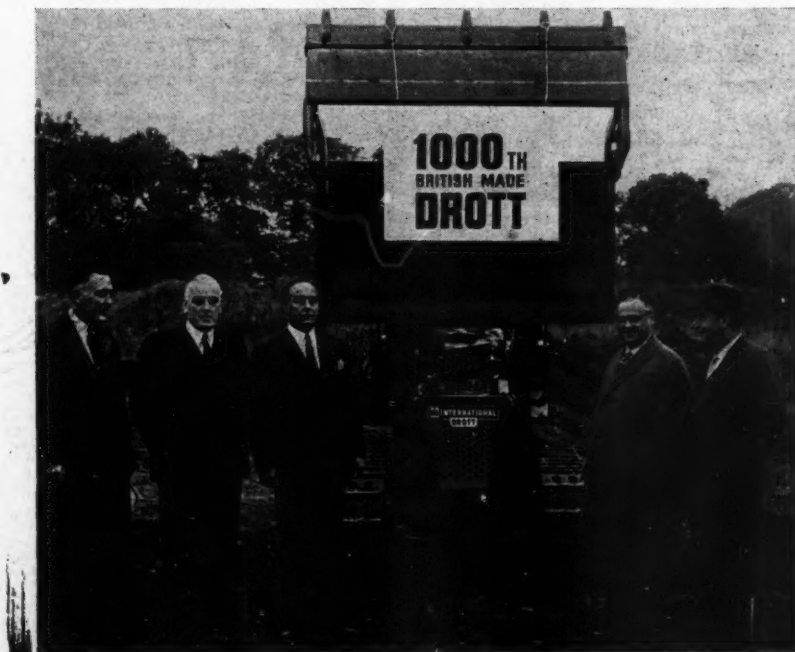
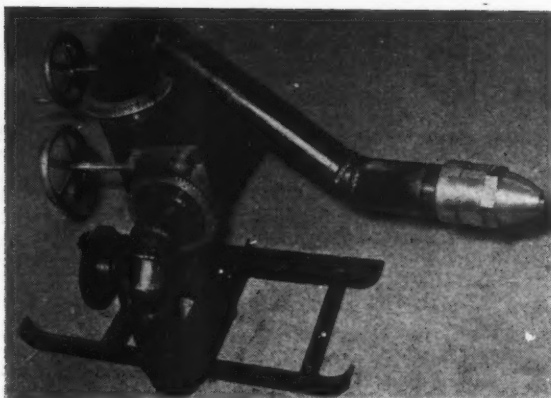
The machine is 1.1 m. high, 1.5 m. long, and 0.88 m. wide. It weighs 300 kilos.

1,000th BRITISH DROTT

International Harvester halted their big earth-moving demonstration at Hemel Hempstead on Wednesday, October 9 (see *The Mining Journal*, October 18, 1957, page 461), to make the surprise introduction of the 1,000th British-made International Drott Skid-Shovel. Accepted by Mr. Stanley Matthews, managing director of I.H. dealers, R. Cripps and Co. Ltd., it was then taken over by Eddison Plant, Ltd., who commenced buying these machines in June, 1956.

The Skid-Shovel was fitted with a four-in-one attachment, which is fast becoming the preferred equipment of the Drott range. It will not only operate as a regular digging and loading shovel but also, at a touch of the hydraulic control, can be converted to carry-type scraper, clamshell and bulldozer.

The first British Drott was produced early in 1956 and the 500th in February this year. In addition to the four-in-one attachment, Drott machines can be fitted with a 1 cu. yd. heavy-duty bucket, a 1½ cu. yd. light-materials bucket, bulldozer, grubber blade and scarifier—all from British production.



Above: The GIG-5-64 Type I hydraulic coal-winning equipment

Alongside: The 1,000th British Drott skid-shovel

MINING MISCELLANY

Until the rutile market improves, the mineral sands separation plant of Australasian Oil Exploration, Ltd., has been placed on a care and maintenance basis. The company extended its interests to rutile and zircon extraction towards the end of 1955.

Development of a practicable process for extending the U.S. supply of uranium from domestic sources by upgrading low-content ores has won for Vanadium Corporation of America one of the 14th Chemical Engineering Achievement Awards.

A new deposit of iron ore, rated as one of the largest in Chile, has been discovered in the coastal range of Nahuelbuta, south of Concepcion. It is estimated to contain over 100,000,000 tons of exploitable ore. The German Krupp organization has been retained to determine the quality of the ore, and a company has been formed to develop the deposit.

The copper refinery to serve medium and small mines in Chile, which Caja de Credito Minero plans to build, is to be set up at Quintero, near Valparaiso. Bitter argument has been in progress for some time as to the site for the refinery, and has resulted in the resignation of the head of Caja de Credito, Sr. Armendo Vogel.

Five German steel companies have founded Ferrum Investment in Montreal to represent their interests in the Ungava ore mines, Labrador. The company has a capital of \$1,000,000. The same companies have a 50 per cent participation in the Ungava Ore Co., the other 50 per cent being held by Cyrus Eaton.

A survey of copper deposits is at present being conducted by the Eire Department of Industry and Commerce on lands about five miles from Macroom, in County Cork, where earlier test borings indicated the presence of copper. When a report of the current survey has been made available, a decision will be made on whether to attempt to exploit the deposits commercially.

The Philippine copper producer, Atlas Consolidated Mining and Development Corporation, has entered into an exploration and development contract with the Newmont Mining Corporation. Newmont will develop copper ore deposits in the Philippines and conduct exploration and development of the new bodies in exchange for Atlas shares.

The Kennecott Copper Corporation is to build a \$20,000,000 electrolytic copper refinery in the Marley Neck area of Anne Arundel County, near Baltimore, Maryland. The initial capacity will be 7,000 tons of refined copper a month and operations are expected to start by 1959. Provision for future expansion will be made. In making this announcement, the vice-president of the company, Mr. Frank R. Milliken, stated that in recent years customers' requirements had called for less fire-refined copper and more electrolytic copper. The new refinery will

permit the electrolytic refining of copper from the Chilean property of Kennecott's subsidiary, Braden Copper Co., and the supply of European customers from this source.

PERSONAL

Having been appointed chairman of Tanganyika Concessions, Ltd., Captain the Right Hon. Charles Waterhouse has resigned the chairmanship of the Zambesia Exploring Co., Ltd., and its subsidiary, the Zambesia Investment Co., Ltd., but will retain his seat on the board. Mr. C. J. Holland-Martin, M.P., has been appointed chairman of Zambesia Exploring Co., Ltd.

Mr. F. L. Wigley has joined the board of Witwatersrand Nigel, Ltd.

The North American representative of the Export Credits Guarantee Department, Mr. Clive Eborall, is touring the U.K. before returning to New York and is visiting a number of leading Chambers of Commerce to meet exporters or prospective exporters to North America.

Mr. A. J. Beeley has been appointed chief engineer of Robins Conveyors (South Africa) (Pty.), Ltd., a subsidiary of Hewitt-Robins, Inc., U.S.A. The company specializes in mechanical handling and conveying, supplying equipment to mines and other industries throughout Africa south of the Equator. Mr. Beeley will shortly be leaving for Johannesburg, the headquarters of Robins Conveyors (S.A.) (Pty.), Ltd.

The Fothergill Prize of £20 for fire prevention or fire fighting has been awarded by the Royal Society of Arts to Mr. P. B. Smith, of Chapel-en-le-Frith, Cheshire, for his essay "A New Method of Suppressing Fires in Mines." In the opinion of the judge this entry records the most novel suggestion that has appeared for a number of years. The entries were judged by Mr. S. H. Clarke, director of the Joint Organization's Fire Research Station.

Many metal companies will be exhibitors at the Atomic Trade Fair, which opens in the New York Coliseum on October 28 and runs for four days. The attendance is expected to include several thousand nuclear industry executives and technicians.

The opening of a London office is announced by the Jamaica Industrial Corporation, a Government agency charged with attracting overseas capital, industry and "know-how" to the island in support of the intensive industrialization programme now under way. The new office will be situated at 140 Park Lane, London, W.1. It will serve financial and commercial interests requiring information about Jamaica.

INCO has established a Chair in Chemical Metallurgy at Columbia University. The Chair is endowed by a grant of \$350,000 and the company made

a gift of \$75,000 for special expenditures incidental to the establishment. The Trustees have designated the new Chair as the Stanley-Thompson Chair of Chemical Metallurgy in honour of Mr. R. C. Stanley, chairman of INCO until his death in 1951, and Dr. J. F. Thompson, his successor; both outstanding alumni of Columbia's School of Mines. The first incumbent will be Dr. J. H. Schulman, of Cambridge University, a Fellow of Trinity Hall and Reader in Surface Chemistry.

The Purchasing Officers Association is holding an advanced purchasing course from April 14 to 19, 1958. Applications should reach the Purchasing Officers Association, Wardrobe Court, 146a Queen Victoria Street, London, by December 31 next.

Representatives of the three "ABC" countries—America, Britain, and Canada—meeting in Toronto this month, announced their final agreement to use a single, unified procedure for presenting information on engineering drawings. It was stated that there are no longer any significant differences in procedure, and drawings prepared in accordance with any one of the standards of the three countries—B.S. 308, ASA 714 (of the U.S.), and CSA B 78.1 (of Canada)—will be easily understood and followed in either of the other countries.

An exhibition of products showing the application of special steels to industry was arranged by Hadfields, Ltd., in connection with the visit to their East Hecla works of H.R.H. the Duke of Edinburgh on October 24. It included equipment and components for colliery and open-cast mining, gold and tin dredging, ore-crushing plants, quarrying, and many other industries.

The following dates of forthcoming meetings have been announced: The Institution of Mining Engineers, annual general meeting, Birmingham, 2-4/7/58; Manchester Geological and Mining Society, 14/11/57; the Midland Counties Institution of Engineers, 13/11/57; the Midland Institute of Mining Engineers, 7/11/57; the North of England Institute of Mining and Mechanical Engineers, 7/12/57; the North Staffordshire Institute of Mining Engineers, 18/11/57; the South Wales Institute of Engineers, Centenary Celebrations, Cardiff, 29 and 30/10/57, o.g.m., 21/11/57.

CONTRACTS AND TENDERS

The Mining Division of the Office of the Economic Co-ordinator, Seoul, is interested in receiving catalogues covering electrical equipment, pipe, rails and parts, coal preparation, mine hoists, and all other types of equipment for use in the mining industry. Interested firms should send their catalogues to U.N.C. Economic Co-ordinator for Korea, Attention RE-MD, Coal Section, A.P.O. 301, San Francisco, California. B.O.T. Ref.: E.S.B. 23128/57 I.C.A. Telephone enquiries to Chancery 4411, extension 354.

Metals and Minerals

Growing U.S. Interest in Niobium

On Tuesday, October 22, the Secretary for the Colonies, Mr. A. Lennox-Boyd, M.P., was scheduled to visit Panda Hill, near Mbeya in the Southern Highlands of Tanganyika, to open a pilot mill for the Mbeya Exploration Co., Ltd.

Panda Hill has many millions of tons of carbonatite containing pyrochlore, an ore of the metal niobium. The deposit was originally discovered by geologists of the Tanganyika Geological Survey, and is now being developed by the Mbeya Exploration Co., Ltd., owned jointly by N. V. Billiton Maatschappij (70 per cent) and the Colonial Development Corporation (30 per cent).

The pilot mill will provide data for the design of a full-scale production plant to be established later. Small quantities of niobium concentrates will become available for market research later this year, and in 1958 larger quantities should be available for sale. Full-scale production will be adjusted to market demand. In view of the large ore reserves available, a plant with capacity of 5,000 tons of ore per day is regarded as a possibility.

The project is reported to be the largest potential niobium producer in the sterling area. The opening of the pilot mill comes at a time when the demand for columbite is still small and sales correspondingly difficult, but the outlook for producers is becoming rather more encouraging.

Reports from the U.S. state that interest in niobium appears to be rising in several quarters of the metals industry and also in the end-use field. A number of firms are expanding their market research activities on this metal. There are probably more than half a dozen companies in the U.S. producing this metal, including Electro Metallurgical Co., Fansteel, Kawecki Chemical and Kennametal. Niobium is used in ferro-alloys, which in turn are used to make special stainless steels and also in nuclear alloys, in electronics (for capacitors in jets and guided missiles) and in the chemical field. A considerable amount of the information about new uses is classified.

It is understood that demands for ferro-columbium are holding up. There are now several producers in the U.S. and imports are coming from a number of countries, but mainly from Great Britain. Imports during the first eight months are roughly estimated at about 100 tons. So far as is known, the ore stockpile goals of the U.S. Government have not been reached. A number of government agencies are interested in the metal.

One of the most important developments this month has been the announcement by Electro Metallurgical Co. that high-purity columbium metal had become commercially available. The metal is produced by this company at Niagara Falls in small cylindrical shapes which are easy to handle prior to melting. It is also available in rough ingots up to 4 in. dia. Roundels will sell at \$55 to \$70 per lb., electrode segments at \$60 to \$75, and rough ingots at \$65 to \$85.

A further announcement last week was that Westinghouse scientists had produced ultra-high purity niobium metal by "cage zone" melting. This company's research is largely directed towards the development of useful niobium alloys for very high-temperature application. Its programme includes tests of the metal at temperatures ranging from 2,000 deg. F. to minus 32 deg. F.; measurements of the rate of oxidation at elevated temperatures; methods of welding; and improvement in methods of analysis for trace impurities. According to a member of the Westinghouse research team, niobium "seems about to emerge as a valuable structural metal of the future."

Coatings for columbium are the subject of a contract awarded to Horizons, Inc., by the Wright Air Development Centre, at Dayton, Ohio. The contract calls for the development of coating techniques for the prevention of oxidation on columbium and columbium base alloys at temperatures up to 2,500 deg. F. The three methods to be explored are cladding, vapour disposition, and diffusion.

U.S. STOCKPILE REVIEW

The Office of Defence Mobilization is setting up a study group to review the U.S. Government's stockpile programme. Any recommendation from the committee as to the nature of the stockpile or disposal of any items, however, has to be passed by Congress, and it might be a few years before the O.D.M. could begin to dispose of any material. At least six months are likely to elapse between the completion of the study group's review and the time when any action could be taken by the O.D.M. in regard to disposal of any supplies from the stockpile. Moreover, any disposal of materials from the stockpile could only be made in conformity with O.D.M. regulations, which stipulate that it should not disrupt or interfere with the orderly processes of the market.

In these circumstances, metal producers have at any rate the assurance that present difficulties will not be intensified by the unloading of materials from the U.S. stockpile on to markets which are already suffering from temporary indigestion.

MAGNESIUM HOLDS ITS OWN

The general opinion at the thirteenth Annual Convention of the Magnesium Association, held at New York on October 17 and 18, was that, although business for 1957 had not been all that could be desired, the magnesium industry had more than held its own in comparison with the general economy. Having due regard to possible stretch-outs in Government defence orders, next year is expected to show a material improvement over 1957.

Production of primary magnesium has been running at near capacity level and

will probably set a new peace-time record of over 80,000 s.tons. Last year's output exceeded 68,000 tons. Although there have been no stockpile calls this year, it is expected that consumption will be about the same as in 1956, with estimated shipments of between 50,000 and 55,000 tons.

NICKEL DELIVERIES DIVERTED

Mr. Gordon Gray, Director of the U.S. Office of Defence Mobilization, has announced that all nickel scheduled for delivery to the Federal Government in 1958 will be diverted instead to private industry. It will be the second successive year that Government suppliers will turn over to civilian users the nickel that had been intended for the U.S. national stockpile.

Mr. Gray said the diversion next year "was made possible by the continuing improvement in the defence position for nickel" and also was based on the assumption that there "will be no substantial change in (U.S.) defence needs". He said that approximately 67,500 s.tons of nickel, market and premium price, would be made available to the civilian economy next year.

Mr. Gray added that, because of these diversions from the stockpile to civilian use, U.S. industry would receive an estimated 58,500 s.tons of nickel in 1957. The U.S. Commerce Department estimated that the diversion in 1958 would increase to 122,500 s.tons the amount of nickel expected to be available for non-defence uses in 1958. The Commerce Department estimate included nickel supplied directly to civilian uses as well as that diverted from stockpile to these ends.

The thirty-mile railway spur, linking INCO's Thompson area in Manitoba with the Canadian National Railways' Hudson Bay line at Sipiwesk, has been completed. By 1960 nickel will be transported over this spur from INCO's \$175,000,000 project, which will have an annual total capacity of 37,500 s.tons.

Completion of the spur before the winter freeze-up enables the company to expedite work on the project by moving in the materials and heavy equipment without regard to weather conditions. The new railway facilities will also allow the movement of equipment which could not otherwise be transported into the area, such as heavy steel for permanent buildings and grinding and crushing equipment.

Freeport Sulphur Co. is to spend more than \$10,000,000 this year on initial expansion of its nickel project in Cuba, for which it arranged last August to borrow a total of \$100,250,000. Morebay Mining Co., a Freeport subsidiary in Cuba, has proved reserves in one location amounting to 50,000,000 s.tons containing about 1.35 per cent nickel, which the company will start mining in 1959.

The Japanese Government and nickel refining industry are planning to cut export prices of nickel products, to break the present stagnation in fresh export trading and promote exports of the metal. Japanese nickel manufacturers are reported to be finding difficulty in concluding fresh contracts with their long-established customers in Europe, mainly because of high prices.

During the first six months of the current financial year (April to March), Japan exported 1,570 tons of metallic nickel and 1,760 tons of ferro-nickel, compared with the export target for the year of 2,870 tons of metallic nickel and 3,110 tons of ferro-nickel. In view of a sharp decline in demand, these targets had been revised downwards from the original plan, which called for exports of 3,520 tons of metallic nickel and 3,340 tons of ferro-nickel.

AUSTRALIAN BAUXITE

The Queensland Government has approved in principle the granting of a franchise for development of the rich Cape York Peninsula bauxite field. Legislation is to be introduced before Christmas granting bauxite mining rights to Consolidated Zinc Corporation, which will undertake at least the first stage in processing aluminium from bauxite on the field.

Reynolds Metals, second largest producer of aluminium in the U.S., has formed a subsidiary in Australia to search for bauxite and other raw materials. The new company, Reynolds Pacific Mines Proprietary, Ltd., has an authorized capital of £A.5,000,000. Preparations are under way to send geological teams into various parts of northern Australia. Permission has been granted to explore about 10,000 sq. miles.

A ninth potline with a production capacity of 27,500 s.tons of primary aluminium annually has been placed in operation at Kaiser's Chalmette plant. It will raise capacity at Chalmette—already the largest reduction plant in the U.S.—to 247,500 tons per year, bringing the company's total capacity to 462,000 tons annually. The cost of the new potline was about \$15,000,000.

The Greek Minister without Portfolio, Mr. G. Cassimatis, has conferred with the president of Kaiser on possible American financing of an aluminium refinery in Greece. The estimated cost of the factory is about \$70,000,000. Kaiser is reported to be studying the question and intends to send a team of experts to Greece. German industrialists are also interested. Greek production of bauxite rose from 180,000 tonnes in 1938 to 700,000 tonnes in 1956, of which 669,400 tons were exported.

The French Government has removed ceiling prices on primary aluminium and, in future, values will be fixed by free bargaining between buyers and sellers. Aluminium consumers have been authorized to adjust the selling prices of their manufactured or processed goods in accordance with the price they have to pay for crude metal.

For a long time French aluminium producers have been pressing to be authorized to raise their selling prices on the grounds that they were below inter-

national levels and did not allow a sufficient margin to finance investments. The selling price now stands at 84.50 frs. per kilo for 99 per cent ingot. According to the latest report from Paris, French

aluminium prices are expected to go up about 7 per cent by the end of this week. Sales to foreign countries are not to be affected by the new aluminium price arrangement.

COPPER • TIN • LEAD • ZINC

(From Our London Metal Exchange Correspondent)

All markets have been weak during the period under review, owing to general considerations such as the behaviour of Wall Street and the lessening of tension in the Near East. Another contributory factor has been the statement from America that, as the planners shorten their estimate of the possible length of a global war, so the requirements of the stockpile become less and in a number of cases there would already appear to be a surplus. In the not too distant future some steps are likely to be taken to remedy this fact. It seems hardly creditable that the U.S. Government could seriously be thinking of disposing of raw materials at the present state of the world's economy, and it is to be hoped that Congress will block any suggested action.

COPPER'S IMPROVED SITUATION IN THE U.S.

Although more people are beginning to say that they think the copper price must be nearing the bottom of the present downtrend, which has been going on now for over a year and a half, very few people are prepared to support their thoughts by action. This has resulted in a steady downward movement due to the very little interest which is being shown by consumers at the moment.

From reports, it seems that the situation in the United States is better than elsewhere, and this is indeed a reversal of the conditions which have prevailed for so long. This viewpoint is based on the reasonably good sales which producers have been making at 27 c. per lb. and customs smelters at 25½ c. per lb., combined with an underlying firmness in the scrap market brought about by a scarcity of offerings. In the rest of the world, although scrap is not easy to come by, there appears to be an appreciable surplus of refined copper of most types which is having difficulty in finding a home, and which, therefore, tends to find its way to the L.M.E. This was once again reflected in further increases of 582 tons in official warehouses, making the present total 18,865 tons.

The latest figures from America show that in the month of September total stocks in the hands of producers and consumers decreased by 20,000 s.tons.

INCREASED TIN PURCHASES BY BUFFER STOCK

The interest in the tin market has centred on the continual weakness in the East and the development of a backwardation in London. It is felt that there have been freer offerings in Singapore, possibly connected with the fact that the Malayan Government have now finished collecting the miners' participation in the capital paid to the International Tin Council.

The tonnage of tin which the buffer stock manager has had to absorb in-

creased last week and, although there may be periods of slackness, it seems that when today's three months' purchases begin to mature a substantial tonnage of metal will pass into the hands of the pool. The meeting of the International Tin Council in London this week was largely connected with matters of organization and with a report by the buffer stock manager. As we go to press, no communiqué has been received. There are reports that the meeting may last three days instead of two, as originally planned.

On Thursday, the Eastern price was equivalent to £728 per ton c.i.f. Europe.

FEATURELESS LEAD-ZINC MARKETS

As for many weeks past the lead and zinc markets have been featureless, although for a change the former has been distinctly the weaker. Demand for lead in the United Kingdom is still running at a fairly high level. It would appear that the margin of over-supply is not very great and any holdup in deliveries could result in a sharp recovery, but the majority feel that present prices may not hold if demand does not increase.

As far as zinc is concerned, there are reports that the motor trade in America are showing more interest in high-grade metal, and with the galvanizing trade fairly active, the offtake in recent weeks has been satisfactory. Elsewhere buying has been of a routine nature, but demand from the motor trades seems likely to increase during coming weeks. This increase, combined with the low price, probably means that the level is stabilized for some time to come, as no major upward movement is likely whilst the prices of other metals are falling, and any major decline is ruled out, as at the present level some raw materials are not moving to smelters.

Closing prices are as follows:

	Oct. 17		Oct. 24	
	Buyers	Sellers	Buyers	Sellers
COPPER ..				
Cash ..	£184	£184½	£182½	£182½
Three months ..	£188	£188½	£185½	£186
Settlement ..		£184½		£182½
Week's turnover	9,825 tons		7,625 tons	
LEAD				
Current ½ month	£85½	£85½	£83½	£84
Three months ..	£85½	£85½	£84½	£84½
Week's turnover	4,375 tons		5,175 tons	
TIN				
Cash ..	£731	£731½	£730½	£731
Three months ..	£728	£729	£725	£726
Settlement ..		£731½		£731
Week's turnover	945 tons		1130 tons	
ZINC				
Current ½ month	£68	£68½	£68	£68½
Three months ..	£68½	£68½	£67½	£68
Week's turnover	5,125 tons		3,850 tons	

London Metal and Ore Prices appear on page 493.

Mining Finance

The Shadow of Man-made Diamonds

More than two years ago the diamond world was sent momentarily rocking with the news from America that in the laboratories of General Electric a synthetic diamond had at last been produced. At that time, only a single small stone of industrial quality had been produced and investors in diamond shares were soon forgetting the development as being of little more than scientific interest. News from Detroit this week may make them start thinking more seriously about the subject.

The General Electric Co., it is claimed, is now ready to mass-produce synthetic diamonds for industry. Officials of the company have stated that they expect to be able to turn out 3,500,000 cts. of industrial stones by the end of 1958, which would be equivalent to half the total of this class of stones now imported from the Belgian Congo and South Africa. One spokesman for the company has claimed that the pilot plant could, if necessary, be expanded to take care of the country's entire needs.

General Electric's synthetics, it was stated, were now selling at \$4.25 per ct. which was more than 40 per cent above the price of imported stones. This is confirmed fairly closely by current prices for natural stones. The Diamond Corporation's present quotation for crushing board is 20s. per ct., but supplies of this quality on the free market, which siphons off the marginal production of illicit and other sources, have been commanding more like 30s. per ct. These supplies are comparatively small, since the Central Selling Organization of De Beers handles about 95 per cent of the world's new production of both gem and industrial stones. The general manager of General Electric has claimed that the company has already produced more than 100,000 cts. of man-made diamonds and has contracted sales commitments for the entire stock. So far as is known, however, it has only proved possible to manufacture diamonds of the smallest size, which would be competitive with crushing board, but could not be used instead of the other and larger grades of industrial diamonds.

Immediate reactions in London to this news has been a sharp marking down of diamond shares, De Beers Defd. at 85s. having dipped to their lowest since 1954. The investment implications of this new G.E.C. development are not for the moment easy to weigh up, although there is now no question that the new claims will have to be taken seriously as a commercial factor in the diamond trade. Presumably, the manufacturing cost of the new synthetic stones could be reduced in due course either through expanded production or through new techniques.

Against this must be put the fact that even at present prices natural stones are substantially cheaper than man-made ones and that the producers, under pressure, could probably cut their quotations and still stay in business. It may also be assumed that in recent years production of the industrial qualities concerned has been running behind consumption so

that, other things being equal, synthetic production in the first instance would only make good the difference. Indeed, the General Electric manager has already been forecasting that the demand for industrial stones might well soar if an assured and adequate supply is developed.

Most prominent in the industrial diamond picture so far as production is concerned, is the Belgian Congo with an an-

nual output of more than 12,500,000 cts. U.S. imports have been running up to around 14,000,000 cts. a year. Ghana and South Africa both account for approximately 2,000,000 cts. a year. From the point of view of the share market, probably Consolidated African Selection Trust, whose Ghana and Sierra Leone production carries a large proportion of
(Continued overleaf)

LONDON MARKET HIGHLIGHTS

Mining share markets were largely dominated by Wall Street in the week to October 23. All sections suffered to a degree, but once more the worst hit were copper shares. This was hardly surprising in view of the persistent weakness of the metal price despite events in the Middle East. Most shares fell to their lowest for the year, particularly substantial falls being seen in Bancroft (22s.), Nchanga (168s. 9d.), R.S.T. (14s. 1½d.) and "Tanks" (107s. 6d.). Messina shares weakened several shillings to 88s. 9d., but the options (40s.) tended to rally later on the theory that there was too great a disparity between the two prices.

Tins were inclined to be dull, though Southern Malayan improved to 10s. 3d. on the sharp rise in last quarter's output. Otherwise, Beralit fell back to 29s. 6d. xd. on selling by holders who had bought the shares when they were cum-dividend. Also easier were London Tin (8s. 7½d.), the shares being depressed by the statement that the company was likely to be adversely affected by the new O.T.C. arrangements. Lead-zincs were also inclined to droop, but Consolidated Zinc (52s. 6d.) rallied after earlier dullness.

It was significant that, although business remained small, gold shares began in the later stages of the week to break away from the influence of Wall Street. The only real selling that was seen at any time stemmed from rather optimistic reports that progress made towards the harnessing of hydrogen power meant that uranium would be replaced as a nuclear fuel. There was nothing new about this theory. What was not mentioned was that any such development was highly unlikely in the foreseeable future and that even more unlikely would be the scrapping of vast uranium power plans now being developed. Nobody doubts that the really long-term outlook for uranium is rather obscure, but from a shareholder's viewpoint South African mines have a guaranteed source of profit from uranium operations for their ten-year periods of contract. In other words, they cannot lose money on uranium.

Nevertheless, the report caused some jitters in Canadian uranium stocks (Algom fell to \$30½) and several South African producers also felt the draught. Among them, Randfontein dropped to 25s. 3d. at one time on Paris selling and weakness was also seen in Luipaards (9s. 10½d.) and Dominion Reefs (13s. 3d.), the last-named being, of course, entirely

dependent on uranium for its source of profits. Rio Tinto, additionally hit by the weakness of copper shares generally, dropped to 54s. 4½d.; the new shares, which had been up to 15s. premium, tumbled to only 4s. 6d. in a few days before later rallying to 7s. premium.

Otherwise, Kaffirs, though tending to ease, seemed always ready to rally and from time to time Cape support easily routed any bears that attempted to operate. The Anglo American bid for African and European with its rather unexciting terms caused barely a ripple of interest. The September quarterly reports, too, were not much of a market factor, but it was generally conceded that they were eminently satisfactory.

As mentioned before in these notes, the undertone of the gold share market is quite good. The initial reaction to a severe break on Wall Street is for an indiscriminate marking down of all London markets. After the first wave of selling, the more thoughtful observers begin to have second thoughts, and the signs are that gold shares may soon return to favour. They must be considered cheap at present prices and those of the younger mines could provide an ideal hedge over the difficult months lying ahead.

Diamonds were hit by a statement from General Electric in America that by the end of next year sufficient synthetic industrial stones could be produced to cover half that country's needs at a price initially about 40 per cent above the cost of the natural article. Already upset by Wall Street, De Beers slumped to 82s. 6d. at one time before rallying to 85s. Elsewhere this week St. John d'El Rey fell to 25s. nominal on the new finance arrangements, but almost immediately rallied to 30s. Ashanti issues improved, the old shares to 13s. and the new—in active trading—to 13s. 3d. Also better were Lake View and Star, which rose to 22s. 3d. following a demand in a market short of stock.

On October 23, Wall Street staged the sharpest rally for many years from what was recognized to be an excessive decline. The rebound was prompted by President Eisenhower's plans to promote greater confidence in America's economy. News of the improving trend across the Atlantic was reflected by an improvement in London, led by oil shares and international favourites. There was also a good recovery in copper shares.

THE BOARD OF TRADE has for disposal ex store at Madeley, near Crewe, approximately 30 tons of Fused Vanadium Pentoxide in five Lots. The material is packed in hessian bags and is offered as it lies, loaded to purchaser's road vehicles or f.o.b. United Kingdom port. Full particulars and Forms of Tender (returnable by November 19, 1957) may be obtained on application to the Board of Trade, General Division, Room 301, Lacon House, Theobalds Road, London, W.C.1. (Telephone No. Chancery 4411, Ext. 295 or 310.)

WIGAN AND DISTRICT MINING AND TECHNICAL COLLEGE

Applications are invited for a post as SENIOR LECTURER IN THE DEPARTMENT OF MINING AND GEOLOGY. Duties commence on May 1, 1958.

Candidates should possess a degree or a recognized diploma in Mining and preferably a First-Class (Colliery Manager's) Certificate. Salary in accordance with the Burnham Technical Scale for Senior Lecturers (£1,350, rising by annual increments of £50 to a maximum of £1,550 per annum).

Further particulars and application form will be sent by the undersigned. Last date for receipt of applications: Friday, November 15, 1957.

E. C. SMITH,
October 18, 1957. Principal.

industrial stones, is most concerned in these developments. The De Beers mines and subsidiaries, apart from Premier, are mainly identified with gems. During the past three years world trade in industrial stones has been running at about £24,000,000 per annum, out of a total diamond business of nearly £75,000,000.

ANGLO'S BID FOR AFRICANS

Anglo American Corporation of South Africa's bid for the African and European Investment Co. came as something of a surprise despite the fact that the former concern has been following a policy of integration during the last decade. Perhaps, one might have thought, Consolidated Mines Selection would have been more of a likely candidate in view of it being a London company with the consequent tax handicap. Anglo American's detailed arguments in favour of the bid have still to come. In the meantime, not all African and European stockholders may be looking on the proposal with a great deal of favour.

Their company is now beginning to reap the rewards of its Orange Free State gold investments with a resultant increase in the 1956 dividend from 2s. 6d. to 3s. 3s., while the resumption of interims with a payment of 1s. for 1957 has aroused hopes that the final might be at least 2s. 6d. Moreover, A. and E. units give an intriguing straddle of interest between gold and coal without the intrusion of the large and currently depressed base-metal element that Anglo American itself carries in such a substantial way. Finally, the proposal that the bid of 60s. for A. and E. 10s. stock units should be satisfied by the allocation of one Anglo American 10s. share at 120s.

for every two A. and E. means that in effect current market prices are being taken as the basis of the offer. The market's view of this basis will doubtless depend on how far it feels that Anglo's present price is artificially deflated by the presumably transient slump in the copper price.

£6,000,000 CONVERTIBLE NOTE ISSUE

At the same time Anglo American announced that it is intending to raise £6,000,000 of further capital by the issue at par of 5½ per cent unsecured convertible notes. Holders of African and European are also looking slightly askance at this in view of the terms in relation to the Monsanto debenture issue, for instance. The Anglo terms, in other words, put a great deal of weight on the attractions of the conversion rights. These are represented by the subscription of Anglo American ordinary for a period of four years from next March at an equivalent price of 153s. 9d.

LONDON TIN TAX

The favourable effect of Overseas Trading Corporation tax concessions for tin mining companies, extensively written about here for the past two weeks, has now received further emphasis so far as the individual producers are concerned. It comes from the London Tin Corporation, one of the two major tin share holding companies. The statement confirms that most tin companies will qualify as O.T.C.s. This will mean that a considerable part of London Tin's income will derive from its investments of this kind. Unfortunately, unlike the private

WOLVERHAMPTON DIAMOND DIE & TOOL Co. Ltd.

BOARTS and INDUSTRIAL DIAMONDS Exporters

11 HATTON GARDEN,
LONDON, E.C.1.

Telephone: HOLborn 3017 Cables: Pardimon, London

Tin Output in Tons of Tin Concentrates

Company	July-Sept. 1957	Months since year end	Financial Year to Date		Company	July-Sept. 1957	Months since year end	Financial Year to Date		
			This	Last				This	Last	
EASTERN										
Ampat	297½	9	857½	1096	Tekka	48	6	91½	64½	
Ayer Hitam	238	3	238	734	Tongkah H. c	233½	3	233½	199	
Berjantai	384½	5	609½	285½	Tronoh	716½	9	2078½	1970½	
Chenderiang	41½	6	84½	101½	NIGERIA					
Gopeng Cons.	190½	12	869	849½	Amal. Tin	1040	6	2054	1933	
Hongkong Tin	93	12	361	407½	Amal. Tin†	163	6	295	239	
Ipoth Tin	71½	6	143½	139	Bisichi	182	9	549	637½	
Kampong Lanjut	226½	6	426	354½	Bisichi†	48½	9	168	270½	
Kamunting	557½	6	1084½	1063½	Ex Lands	164	9	397	454	
Kent (F.M.S.)	67½	9	76½	178½	Gold & Base	278	9	764	529	
Kepong D.	88½	3	88½	72½	Gold & Base†	45	9	95	132½	
Killinghall	158	12	346½	311½	Jantar	89½	12	279½	305	
Kinta Kellas	66½	6	111½	139½	Jantar†	78½	12	265½	227½	
Kinta Tin	177½	9	538	352½	Jos Tin	40½	2	40½	37½	
Kramat Tin	84½	3	84½	93½	Kaduna P.	30½	9	67	46	
Kuala Kampar	409½	6	810½	1224	Kaduna S.	75	9	227½	245½	
Larut Tin	106	9	298½	785	Keffi	21½	6	43½	20	
Lower Perak	431	5	544½	731½	Keffi†	—	6	—	160	
Malayan Tin	438½	3	438½	592½	London Nig.	64	6	128	38	
Malaysiam	40½	6	72½	49½	Naraguta Ex.	56	9	165½	138½	
Pengkalan	105½	12	470	532	Naraguta K.	46½	9	94½	109½	
Petaling a	210½	12	1127½	1276½	Ribon	68	6	118	87	
Puket Tin	197½	9	499½	439½	Ribon†	1	6	1	17½	
Rahman H.	80½	3	80½	73	Tinfields of Nig.	9½	6	20½	10½	
Rambutan	41½	3	41½	42	U. Tin	23½	6	36½	46	
Rantau	194	3	194	242½	U. Tin†	2½	6	3½	27	
Renong	175½	3	175½	153½	MISC.					
Selayang	26	12	192	222	Beral† Tin	86	6	147	87	
Southern Kinta	1069	6	2072½	1886½	Beral† Tin†	500	6	1022	1110	
S. Malayan b.	916	3	916	652½	Geevor Tin d.	235	6	408	328	
Southern Tronoh	179	9	628½	528½	S. Crofty Tin d.	164½	9	544½	532½	
Sungei Besi	306½	6	624½	635½	S. Crofty Tin ‡ e	—	9	—	7	
Sungei Kinta	46½	9	202½	251½						
Taiping	182½	9	479	603½						
Tanjong	202½	9	888½	1020½						

† Columbite

‡ Wolfram

a Nos. 3 and 4 dredges in low-grade ground; No. 6 in tailings.

b A sixth dredge began working on August 16.

c Harbour dredge closed down in July for three months.

d Lower output due to annual holidays.

e Operations temporarily suspended at Castle-an-Dinas owing to low wolfram price.

shareholder, London Tin may actually be adversely affected as the Finance Act stands at present, because the Corporation will now have to pay profits tax on dividends from O.T.C.s. Formerly, it did not have to do so. Profits tax liability will in consequence be "substantially increased".

The effect on distributable profits will "not be material" in the current year to March 31 next, it is stated. Thus an unchanged interim of 10 per cent on the 4s. shares is accompanied by the forecast "if no unforeseen circumstances arise in the meantime" that there should be a balance payment of 20 per cent, making 30 per cent for the year, the same as for the past two periods, the last of which was for only eleven months, there having been a change of the accounting year-end from April 30 to March 31. As with British Tin Investment, which is in a similar position (and one in which it is unlikely that the Chancellor really meant to place them) London Tin is making representations to the revenue authorities in the hope that the matter will be adjusted.

SOUTHERN MALAYAN TIN

There have been some bright items of news from the actual Malayan tin producers. Southern Malayan announces a bumper output for the September quarter of 916 tons of tin concentrates, an increase of no less than 70 per cent compared with the 535½ tons for the June quarter and an even greater rise over the March figure of 428½ tons. Until last July it had been thought that it would be a long time before this multi-dredge concern could effect a major expansion of

output. But it was then announced that a second-hand dredge had been acquired (on what are believed to have been particularly favourable terms) and that this was situated on an adjoining area and could thus be quickly brought into economic operation. This was, in fact, achieved on August 16 and for the last half of the September quarter Southern Malayan thus had six dredges working.

Providing that they all continue to operate throughout the current quarter there could be a still higher production announcement next January. On the basis of the September quarter output an annual production of 3,600 tons or more is in sight compared with only 2,257 tons in the year that ended on June 30. This prospect, added to the potential O.T.C. tax saving, portends a material increase in dividends particularly if the Buffer Stock Manager is successful in holding the metal price at the relatively high level of £730 per ton (compared with a 1956 average of £787) which he is contracted to do.

Southern Malayan's final dividend for 1956-57 has still to come. The interims have totalled 1s. 2d. Assuming a final of 3d. the yield at 10s. would be over 14 per cent, which is an attractive return in the light of the usefully higher distribution that should be in store for 1957-58.

SAN FRANCISCO MINES

Another company in which the O.T.C. element is now cropping up is San Francisco Mines of Mexico, one of the heaviest taxpayers in the mining world. The directors expect that the company will

(Continued overleaf)

U.K. ENGINEERING AND MINING GROUP WITH AUSTRALIAN SUBSIDIARY COMPANY REQUIRE:

1. PRACTICAL GEOLOGIST for prospecting and mining operations. Should be fully experienced in exploration and testing for metallic ores in alluvial deposits, experience in concentration and separation processes an advantage.
2. MINING ENGINEER for development work on concentration and separation processes and thereafter to act as Chief Engineer covering a number of installations. Experience should have provided a complete knowledge of the latest practice in hydraulic and other concentration processes and in mechanical and electrostatic separation of alluvial ores.

QUALIFICATIONS NECESSARY for the above appointments:

- (a) Age under 38.
- (b) University training to degree standard and particularly well qualified in hydraulics.
- (c) Practical experience and proved practical ability over several years in the class of work described.
- (d) Appointees to be willing to undertake a preliminary period of work in the U.K. and then to continue their work in Northern Territories and New Guinea and other parts of Australasia.

CONDITIONS OF EMPLOYMENT:

- (i) Liberal commencing salaries according to qualifications and experience.
- (ii) Superannuation Scheme.
- (iii) Free first-class passages, including family.

The positions offer considerable scope for further advancement and should only be considered by prospective applicants who are capable of hard work and original thought.

Applicants must have the right personality to lead as Executives and the ability to reach eventually positions of top seniority in the Organization.

Applications, which will be treated in confidence, should be sent in the first place to the Secretary, 18 Queen Street Mayfair, London, W.1. They should be comprehensive, give full personal details as well as particulars of professional training and practical experience, should describe the class of work previously undertaken by the applicant in some detail, and give particulars of previous salary levels.

LONDON METAL AND ORE PRICES, OCT. 24, 1957

METAL PRICES

Aluminium, 99.5%, £197 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) basis 20s. 0d./21s. 0d. nom. per unit, c.i.f.

Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 11s. 3d. lb.
Cerium (99% nett), £13 18s. lb. delivered U.K.
Chromium, Cr. 99% 7s. 2d. lb.
Cobalt, 16s. lb.
Germanium, 99.99%, Ge. kilo lots 3s. 4d. per gram
Gold, 249s. 8½d.

Iridium, £27/29 oz. nom.
Lanthanum (98/99%) 15s. per gram
Manganese Metal (96%-98%) £310
Magnesium, 2s. 5½d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £20/22 oz. nom.
Osmiridium, nom.
Palladium, £7 10s./£8 0s. oz.
Platinum U.K. and Empire Refined £31/£34 oz.
Imported £28 5s./£28 15s. nom.
Quicksilver, £74 ex-warehouse
Rhodium, £42 oz.
Ruthenium, £15/£17 oz. nom.
Selenium, 75s. nom. per lb.
Silver, 78½d. f. oz. spot and 78½d. f'd.
Tellurium, 15s. 16s. lb.

ORES AND OXIDES

Bismuth	30% 3s. 3d. lb. c.i.f.
Chrome Ore—	18/20% 5s. 0d. lb. c.i.f.
Rhodesian Metallurgical (semifriable) 48%	£19 5s. 0d. per ton c.i.f.
" Hard Lumpy 45%	£19 5s. 0d. per ton c.i.f.
" Refractory 40%	£13 0s. 0d. per ton c.i.f.
" Smalls 44%	£18 0s. 0d. per ton c.i.f.
Baluchistan 48%	£12 0s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade	nom.
Fluorspar—	
Acid Grade, Flotated Material	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% Ca F ₂)	156s. 0d. ex works
Lithium Ore—	
Petalite min. 3½% Li ₂ O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Lepidolite min. 3½% Li ₂ O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Ambygonite basis 7% Li ₂ O	£26 5s. per ton f.o.b. Beira
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite Raw (ground)	£21 0s./£22 0s. d/d
Manganese Ore Indian	
Europe (46%-48%) basis 95s. freight	125d./127d. per unit c.i.f. nom.
Manganese Ore (43%-45%)	98d./100d. per unit c.i.f. nom.
Manganese Ore (38%-40%)	92d./94d. per unit nom.
Molybdenite (85% basis)	8s. 5d. nom. per lb. (f.o.b.)
Titanium Ore—	
Rutile 95/97% TiO ₂ (prompt delivery)	£45/£44 per ton c.i.f. Aust'n
Ilmenite 52/54% TiO ₂	£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	106s. 0d./111s. 0d. per unit c.i.f.
Vanadium—	
Fused oxide 90-95% V ₂ O ₅	£11-£11½ per unit c.i.f.
Zircon Sand (Australian) (65-66% ZrO ₂)	£18 per ton c.i.f.

qualify as an O.T.C. and "on this basis" have declared an unchanged interim of 1s. 3d. for the year that ended on September 30. In view of the fall in lead and zinc prices, it might well have been thought that this Mexican producer would have cut its 1956-57 distribution. There is an evident indication now that tax savings are expected to offset, anyway to some extent, the probable lower profits. This is possible in view of the fact that in 1955-56 no less than 85 per cent of earnings went in taxation. True, practically all this was paid in Mexico. But even a modest saving in the U.K. portion could make quite a difference proportionately to the small amount that is left to the company for distribution to shareholders.

ASSISTANT GEOLOGIST required by KUWAIT OIL COMPANY

A University Graduate with an Honours degree in Geology is required by the Company for service in KUWAIT.

Applicants, aged not less than 23 years, should have spent at least 6 months working in subsurface geology including well-siting, sample handling, well-logging and report writing.

Salary according to experience but total pay, including local allowance, not less than £1,710 per annum.

Write for application form, giving brief details, quoting K.2275, to Box X/14, c/o 191 Gresham House, E.C.2.

ENGINEER DESIGNER

required for HYDRAULIC AND MECHANICAL DESIGN on new project of original nature giving excellent scope.

Applicants should be under 35 years of age, hold an engineering degree, or equivalent in mechanical engineering, and must have a particularly sound theoretical and practical knowledge of hydraulics, pumps, valves, fittings and the flow of liquids in pipes. Experience in Marine Engineering would be an advantage particularly if connected with Suction Dredging Plant and Equipment, or experience involving solids carried in suspension.

Commencing salary, £1,400/£1,500 depending on experience. Superannuation scheme after 12 months. Car allowance. Assistance towards housing if required.

Opportunity in the future for travel overseas.

Considerable scope for further advancement.

Reply in first instance giving full PERSONAL particulars and details of experience to: P.A. to Managing Director, Dowsett Holdings Limited, Tallington, Stamford, Lincs.

(All applications will be treated in confidence.)

San Francisco 10s. stock units are 19s. ex dividend, which is an exceedingly low price in relation to a possible maintenance of the year's distribution at 4s. 6d. Here again, in other words, a good deal of the poorer prospects for 1957-58 is already being discounted.

"TANKS" SHARE BONUS

With Tanganyika Concessions there is no O.T.C. situation, this company having been controlled and taxed in Southern Rhodesia since 1950. "Tanks" had a good year in the period to July 31. Its principal shareholding, Union Minière, again paid higher dividends for the calendar year 1956, and it is these that come into the present Tanganyika accounts. In addition, the Benguela Railway, in which a 90 per cent equity interest is held, increased its payment. The upshot is that "Tanks" consolidated net profit rose from £3,982,621 to £4,309,796. After tax and preference dividends, there is a balance of £4,017,226, out of which a higher Ordinary distribution of 9s. 6d. against 9s. is to be made, with a final of 6s. 6d. This absorbs £3,639,842 and leaves £2,677,917 against £2,290,533 to be carried forward after debiting a provisional tax adjustment of £135,000. A profit of £509,780 against £506,000 has been made on the redemption of Benguela Railway debentures and this has been credited to capital reserve.

The real surprise in the "Tanks" statement was the announcement of the distribution of one new 10s. Ordinary for each unit held on January 31 next. Treasury consent has been obtained. The object of the exercise, it is stated, is to restore the capital cut made at the time of the reconstruction in 1938. It will also have the effect of halving the present market price of 5½, which is rather too heavy for the ordinary investor. Unfortunately the company, like other base-metal concerns, faces less profitable conditions for its current financial year. Both Union Minière and the Benguela Railway will be adversely affected by the drastically lower copper price. Union Minière's first interim on account of 1957 is due shortly.

Concrete Results From Cementation.

—In the year ended March 31, 1957, group trading profits of The Cementation Co. rose by more than 35 per cent from £681,065 to £932,698. Taxation took the greater part of the increase, however, leaving net taxed earnings at £358,685 against £337,346. The dividend is unchanged at 12½ per cent absorbing £143,750. The board intimates that it has under immediate consideration the raising of new capital. Details will be submitted shortly. Meeting, London, December 10. Mr. A. R. Neelands is chairman.

African and European Retire Dividends.—African and European Investment Co. announce that from the present declaration of 1s. per 10s. unit onwards, dividends will be considered on an interim and final basis. This replaces the previous practice of declaring one dividend in March in respect of the preceding financial year. Henceforward an interim will be considered before the end of the financial year, and a final when the accounts are completed.

Sagging Copper Price Cuts Mt. Morgan Payment.—Mount Morgan's profit in the year to June 30, 1957, was £395,049, compared with £581,533 in the preceding

period. However, the true deterioration in the situation is masked by the inclusion in this year's accounts of non-recurring items totalling £434,012. Dividends declared or recommended total 1s. 6d. per share against 2s. last year. Meeting, Sydney, November 7.

Kramat Pulai Maintains Dividend.—In spite of reduced earnings (£6,290 against £9,889) Kramat Pulai have been able to maintain their dividend at last year's rate of 6d. per share (including a bonus of 3d.), but the special distribution of 2s. out of accumulated profits is not repeated. Meeting, London, November 11.

New Manitoba Nears Production.—New Manitoba Mining and Smelting hope to bring their Cat Lake nickel-copper deposit into production at 1,000 tons a day by the end of this year. Announcing this in the company's annual report for the period ended April 30, the president, Mr. M. G. Smerchanski, said that the shaft had reached its final depth of 600 ft., and that stations and loading pockets were being excavated at four levels. Indicated ore reserves are about 2,000,000 tons, sufficient for 5½ years' milling, at a grade of 0.33 per cent nickel, 0.75 per cent copper and 0.06 per cent cobalt, but materially higher grades have been revealed in initial development. Annual operating profits are estimated by Mr. Smerchanski at \$2,100,000.

Obituary

PROF. J. A. S. RITSON

We regret to record the death of Lieut.-Col. John Anthony Sydney Ritson. Born at Pelton, Co. Durham, and educated at Uppingham, Prof. Ritson was a leading mining technologist and also a soldier of great distinction. In the First World War he served with the Durham Light Infantry, and from 1916 to 1919 commanded the 12th Royal Scots. He held the bar to the D.S.O. and was mentioned in dispatches on four occasions. In the years 1910 to 1913 he represented England at Rugby Football.

From 1912 to 1921 Prof. Ritson was H.M. Inspector of Mines, first for Scotland and subsequently for Yorkshire and North Wales. His academic career began in 1923, when he was appointed Professor of Mining in Leeds University, a post he held till 1935, in which year he was made O.B.E. In 1936 he was appointed to the Chair of Mining in the Royal School of Mines at the Imperial College of Science and Technology, London. On his retirement from the Imperial College in 1952 he was appointed Professor Emeritus of Mining in the University of London. In 1955, the Imperial College elected him to honorary fellowship. He was Dean of the Royal School of Mines from 1947 to 1949 and was a past president of the Institution of Mining and Metallurgy and of the Institution of Mining Engineers.

At the outbreak of the second world war he was seconded to the Mines Department as Director of Mining Supplies, subsequently becoming production director at the Ministry of Fuel and Power. Other bodies to which he rendered great assistance include the Geological Survey of Great Britain, the Coal Commission, and the Lord President's Natural Resources (Technical) Commission. His technical guidance was frequently sought by foreign governments and by mining companies both at home and abroad.

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